

# SEQUENCE LISTING

<110> KIRCHHOFF, LOUIS V  
KEIKO, OTSU

<120> RECOMBINANT POLYPEPTIDES FOR DIAGNOSING INFECTION WITH  
TRYPANOSOMA CRUZI

<130> PNL21311A

<150> US 60/430,654

<151> 2002-04-02

<160> 50

<170> PatentIn version 3.2

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Gln Cys Gln Gln Pro Arg Ser Arg Asn Leu Gln Trp Arg Cys His Phe	
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Val Tyr Tyr Gly Arg Thr Ala Gly Pro Ile Val His Gln Thr Val Gln	
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Pro Tyr Lys Trp Arg Ser Leu Val Cys Val Gly His Gly Gln Ile	
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acg cat cat ttt tgc ccc acc tca gaa aaa aac gtt cat cac agt gtt	240
Thr His His Phe Cys Pro Thr Ser Glu Lys Asn Val His His Ser Val	
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Tyr Asn Arg Ile Pro Ala Gly Cys Ser Ser Asn Arg Glu Glu Ser	
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Phe Asp Val Cys His Leu Gln Phe His Glu Asn Ser Cys Asp Tyr	
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Ala Gly Ser His Asn Pro Glu Gly Val Leu Ala Ser Trp Lys Cys Gly	
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Leu His Gly Leu Ser Glu Phe Pro His Ala His Asp Arg Gly Gly	
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Val Val Ala Val Ala Thr Trp Ala His Cys Phe Ala Cys Glu Tyr	
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Gln Thr Cys Ile Leu Arg Cys Tyr Arg Leu Gln Cys Ile His Cys Thr	
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Trp Leu Val Ser Ser Asp Trp Ile His Gly Pro Ala Pro Thr Gly	
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Arg Lys Tyr His Phe Gln Lys Arg Asn Asp Lys Ala Thr Arg	
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aaa agt gaa aaa ggc cga gaa aga aaa att gga cgc cat taa ccg ggc	768
Lys Ser Glu Lys Gly Arg Glu Arg Lys Ile Gly Arg His Pro Gly	
235 240 245	
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Gly Arg Gly Gly Lys Gly Asn Ile Ser Thr Pro Tyr Asn Ile	
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Ser	Gly	Ala	Gly	Thr	Leu	Phe	Thr	Ala	Ala	Gly	Gly	Ser	Leu	Gly	Lys	
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Met	Pro	Arg	Ala	Val	Val	Leu	Glu	Asp	Gly	Ala	Leu	Tyr	Val	Ala	Asp	
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Arg	Pro	Asn	Gly	Ala	His	Asp	Leu	Phe	Val	Ser	Asp	Thr	Gly	Lys	Ser	
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Asp Gly Ser Tyr His Pro Thr Val Thr Pro Thr Pro Pro Leu Thr Pro	
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ttgttgttgt tgctgtccga ctctcggggg acgtacaccg acctacttac ttacagagag	3335
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Phe Phe Ile Ser Arg Ser Cys Ala Gly Cys Ser Gln Gly Gln Thr Asp  
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Gly Pro Ser Gly Ala Gly Thr Leu Phe Thr Ala Ala Gly Gly Ser Leu  
30 35 40 45

Gly Lys Asp Ala Ser Thr Leu Leu Leu Cys Asp Gln Gly Gly Gly Gly  
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Ser Ser Val Arg Leu Val Asn Lys Ser Gly Ile Phe Thr Leu Ala Gly  
65 70 75

Ser Lys Thr Thr Arg Gly Asn Gln Asn Gly Pro Ala Ala Thr Ala Leu  
80 85 90

Phe Asn Met Pro Arg Ala Val Val Leu Glu Asp Gly Ala Leu Tyr Val  
95 100 105

Ala Asp Ser Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Ile Val  
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Thr Ser Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro  
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Tyr Ser Arg Pro Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly  
145 150 155

Lys Ser Arg Ile Ile Phe Ala Pro Leu Gln Lys Gln Thr Phe Ile Thr  
160 165 170

Val Phe Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys  
175 180 185

Ser Arg Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ser Ile  
 190 195 200 205

Asn Met Gln Gly Ala Thr Thr Pro Lys Asp Tyr Trp Gln Val Gly Asn  
 210 215 220

Ala Asp Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu  
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Asp Lys Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met  
 240 245 250

Ser Leu Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro  
 255 260 265

Asp Val Leu Leu Arg Trp Pro His Gly Pro Ile Val Ser Leu Val Asn  
 270 275 280 285

Ile Asn Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile  
 290 295 300

Val His Asp Gly Ser Tyr His Pro Thr Val Thr Pro Thr Pro Pro Leu  
 305 310 315

Thr Pro Thr Pro Thr Pro Glu Val Thr Pro Thr Pro Thr Val Thr Pro  
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Thr Pro Thr Pro Glu Val Thr Pro Thr Pro Pro Val Thr Pro Ser Pro  
 335 340 345

Thr Ile Thr Ile His Arg Gly Phe Ala Val Ala Ala Phe Pro Ala Gln  
 350 355 360 365

Ser Leu Pro Ile Glu Asp Pro Arg Leu Met His Glu Leu Leu Ser Trp  
 370 375 380

Leu Met Lys Asp Val Gly Ile Ala Phe Glu Ser Thr Asp Phe Phe Ala  
 385 390 395

Val Phe Pro Pro Asp Arg Glu Val Leu Val Pro Gly Tyr Val Asn Val  
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Ser Thr Trp Asn Asn Leu Thr Val Leu Phe Asn Phe Asp Arg Thr Ile  
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Val Ile Thr Glu Tyr Phe Thr Pro Glu Gly Met Ser Ser Glu Glu Gly  
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Gln Ala Arg Leu Phe Ala Ser Pro Trp Tyr Trp Thr Arg Asn Phe Leu  
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Asp Ser Leu Lys Lys Thr Val Ala Trp Lys Asp Leu Glu Ala Phe Cys  
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Met Val Asn Cys Val Glu His Cys Glu Thr Met Thr Phe His Lys Ser  
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Glu Cys Val Gly Tyr Val Arg Pro Pro Val Cys Asn Asp Val Cys Val  
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Gly Ala Val Val Ser Ser Val Val Leu Gly Ala Thr Gly Ile Ala Leu  
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 Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
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 ttt att acg gaa gga ctg ctg ggc cca tcg tac atc aaa ccg tac agc 144  
 Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
 35 40 45  
 cgt aca aat ggc gct cat gac ttg ttt gtg tcg gac acg ggc aaa tca 192  
 Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
 50 55 60  
 cgc atc att ttt gcc cca cct cag aaa aaa acg ttc atc aca gtg ttt 240



Arg 65	Ile	Ile	Phe	Ala	Pro 70	Pro	Gln	Lys	Lys	Thr 75	Phe	Ile	Thr	Val	Phe 80	
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cag Gln	gga Gly	gcc Ala 115	aca Thr	acc Thr	ccg Pro	aag Lys	gag Glu 120	tac Tyr	tgg Trp	caa Gln	gtt Val	gga Gly 125	aat Asn	gcg Ala	gac Asp	384
tgc Cys	atg Met	ggc Gly	tat Tyr	cag Gln	agt Ser	tcc Ser 135	ctc Leu	atg Met	ctc Leu	acg Thr 140	acc Thr	gag Glu	gag Glu	gat Asp	aaa Lys	432
ctc Leu 145	ctc Leu	tac Tyr	tac Tyr	ggc Gly 150	ata Ile	tta Leu	aat Asn	gga Gly	acc Thr	cca Pro 155	tcc Ser	atc Ile	atg Met	tct Ser	tta Leu 160	480
ccc Pro	gcc Ala	acc Thr	aaa Lys	acg Thr 165	aag Lys	acg Thr	gaa Glu	gca Ala	ccc Pro 170	aga Arg	att Ile	tgc Cys	ccg Pro	gat Asp 175	gtg Val	528
ttg Leu	ttg Leu	cag Gln 180	tgg Trp	cca Pro	cat His	ggg Gly	ccc Pro 185	att Ile	gtt Val	tgc Ser	ctt Leu	gtg Val	aat Asn 190	att Ile	aac Asn	576
aaa Lys	cat His	gca Ala 195	ttt Phe	tac Tyr	gtt Val	gtt Val	acc Thr 200	gcc Ala	tcc Ser	aat Asn	gta Val 205	tac Tyr	att Ile	gta Val	cat His	624
gat Asp 210	ggc Gly	tgc Ser	tat Tyr	cat His	ccg Pro	act Thr 215	gga Gly	tcc Ser	atg Met	gcc Ala	cag Gln 220	ctc Leu	caa Gln	cag Gln	gca Ala	672
gaa Glu 225	aat Asn	aat Asn	atc Ile	act Thr	aat Asn 230	tcc Ser	aaa Lys	aaa Lys	gaa Glu 235	atg Met	aca Thr	aag Lys	cta Leu	cga Arg	gaa Glu 240	720
aaa Lys	gtg Val	aaa Lys	aag Lys	gcc Ala 245	gag Glu	aaa Lys	gaa Glu	aaa Lys	ttg Leu 250	gac Asp	gcc Ala	att Ile	aac Asn	cgg Arg 255	gca Ala	768
acc Thr	aag Lys	ctg Leu	gaa Glu 260	gag Glu	gaa Glu	cga Arg	aac Asn	caa Gln 265	gcg Ala	tac Tyr	aaa Lys	gca Ala 270	gca Ala	cac His	aag Lys	816
gca Ala	gag Glu	gag Glu	gaa Glu 275	aag Lys	gct Ala	aaa Lys	aca Thr 280	ttt Phe	caa Gln	cgc Arg	ctt Leu	ata Ile 285	aca Thr	ttt Phe	gag Glu	864
tcg Ser	gaa Glu 290	aat Asn	att Ile	aac Asn	tta Leu	aag Lys 295	aaa Lys	agg Arg	cca Pro	aat Asn 300	gac Asp	gca Ala	gtt Val	tca Ser	aat Asn	912
cgg	gat	aag	aaa	aaa	aat	tct	gaa	acc	gca	aaa	act	gac	gaa	gta	gag	960

Arg 305	Asp	Lys	Lys	Lys	Asn 310	Ser	Glu	Thr	Ala	Lys 315	Thr	Asp	Glu	Val	Glu 320	
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gct Ala	gag Glu	gcc Ala	gcc Ala	aag Lys	gcc Ala	gtg Val	gag Glu	acg Thr	gag Glu	aag Lys	cag Gln	agg Arg	gca Ala	gct Ala	gaa Glu	1104
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gcc Ala	acg Thr	aag Lys	gtt Val	gcc Ala	gaa Glu	gcg Ala	gag Glu	aag Lys	cag Gln	aag Lys	gca Ala	gct Ala	gag Glu	gcc Ala	gcc Ala	1152
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gcc Ala	gaa Glu	gcg Ala	gag Glu	aag Lys	cag Gln	agg Arg	gca Ala	gct Ala	gaa Glu	gcc Ala	atg Met	aag Lys	gtt Val	gcc Ala	gaa Glu	1248
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gct Ala	gaa Glu	gcc Ala	acg Thr	aag Lys	gtt Val	gcc Ala	gaa Glu	gcg Ala	gag Glu	aag Lys	cag Gln	aag Lys	gca Ala	gct Ala	gag Glu	1440
465					470				475						480	
gcc Ala	gcc Ala	aag Lys	gcc Ala	gtg Val	gag Glu	acg Thr	gag Glu	aag Lys	cag Gln	agg Arg	gca Ala	gct Ala	gaa Glu	gcc Ala	acg Thr	1488
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		500					505						510			
tcg Ser	aag Lys	gac Asp	tcg Ser	acg Thr	agc Ser	gac Asp	aag Lys	ggg Gly	ttg Leu	gcg Ala	agc Ser	gat Asp	aag Lys	gac Asp	ggc Gly	1584
		515					520					525				
aag Lys	aac Asn	gcc Ala	aag Lys	gac Asp	cgc Arg	aag Lys	gaa Glu	gcg Ala	tgg Trp	gag Glu	cgc Arg	att Ile	cgc Arg	cag Gln	gcg Ala	1632
		530				535					540					
att cct	cgt	gag	aag	acc	gcc	gag	gca	aaa	cag	cgc	cgc	atc	gag	ctc		1680

Ile	Pro	Arg	Glu	Lys	Thr	Ala	Glu	Ala	Lys	Gln	Arg	Arg	Ile	Glu	Leu	
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ttc	aag	aag	ttc	gac	aag	aac	gag	acc	ggg	aag	ctg	tgc	tac	gat	gag	1728
Phe	Lys	Lys	Phe	Asp	Lys	Asn	Glu	Thr	Gly	Lys	Leu	Cys	Tyr	Asp	Glu	
				565					570					575		
gtg	cac	agc	ggc	tgc	ctc	gag	gtg	ctg	aag	ttg	gac	gag	ttc	acg	ccg	1776
Val	His	Ser	Gly	Cys	Leu	Glu	Val	Leu	Lys	Leu	Asp	Glu	Phe	Thr	Pro	
			580					585					590			
cga	gtg	cgc	gac	atc	acg	aag	cgt	gca	ttc	gac	aag	gcg	agg	gcc	ctg	1824
Arg	Val	Arg	Asp	Ile	Thr	Lys	Arg	Ala	Phe	Asp	Lys	Ala	Arg	Ala	Leu	
			595				600					605				
ggc	agc	aag	ctg	gag	aac	aag	ggc	tcc	gag	gac	ttt	gtt	gaa	ttt	ctg	1872
Gly	Ser	Lys	Leu	Glu	Asn	Lys	Gly	Ser	Glu	Asp	Phe	Val	Glu	Phe	Leu	
	610					615					620					
gag	ttc	cgt	ctg	atg	ctg	tgc	tac	atc	tac	gac	ttc	ttc	gag	ctg	acg	1920
Glu	Phe	Arg	Leu	Met	Leu	Cys	Tyr	Ile	Tyr	Asp	Phe	Phe	Glu	Leu	Thr	
625					630					635					640	
gtg	atg	ttc	gac	gag	att	gac	gcc	tcc	ggc	aac	atg	ctg	gtt	gac	gag	1968
Val	Met	Phe	Asp	Glu	Ile	Asp	Ala	Ser	Gly	Asn	Met	Leu	Val	Asp	Glu	
				645					650					655		
gag	gag	ttc	aag	cgc	gcc	gtg	ccc	aag	ctt	gag	gcg	tgg	ggc	gcc	aag	2016
Glu	Glu	Phe	Lys	Arg	Ala	Val	Pro	Lys	Leu	Glu	Ala	Trp	Gly	Ala	Lys	
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gtc	gag	gat	ccc	gcg	gcg	ctg	ttc	aag	gag	ctc	gat	aag	aac	ggc	act	2064
Val	Glu	Asp	Pro	Ala	Ala	Leu	Phe	Lys	Glu	Leu	Asp	Lys	Asn	Gly	Thr	
			675				680					685				
ggg	tcc	gtg	acg	ttc	gac	gag	ttt	gct	gcg	tgg	gct	tct	gca	gtc	aaa	2112
Gly	Ser	Val	Thr	Phe	Asp	Glu	Phe	Ala	Ala	Trp	Ala	Ser	Ala	Val	Lys	
	690					695					700					
ctg	gac	gcc	gac	ggc	gac	ccg	gac	aac	gtg	ccg	gat	atc				2151
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Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser

35

40

45

Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
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Arg Ile Ile Phe Ala Pro Pro Gln Lys Lys Thr Phe Ile Thr Val Phe  
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Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys Ser Arg  
85 90 95

Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ala Ile Asn Met  
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Gln Gly Ala Thr Thr Pro Lys Glu Tyr Trp Gln Val Gly Asn Ala Asp  
115 120 125

Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu Asp Lys  
130 135 140

Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met Ser Leu  
145 150 155 160

Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro Asp Val  
165 170 175

Leu Leu Gln Trp Pro His Gly Pro Ile Val Ser Leu Val Asn Ile Asn  
180 185 190

Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile Val His  
195 200 205

Asp Gly Ser Tyr His Pro Thr Gly Ser Met Ala Gln Leu Gln Gln Ala  
210 215 220

Glu Asn Asn Ile Thr Asn Ser Lys Lys Glu Met Thr Lys Leu Arg Glu  
225 230 235 240

Lys Val Lys Lys Ala Glu Lys Glu Lys Leu Asp Ala Ile Asn Arg Ala  
245 250 255

Thr Lys Leu Glu Glu Glu Arg Asn Gln Ala Tyr Lys Ala Ala His Lys  
260 265 270

Ala Glu Glu Glu Lys Ala Lys Thr Phe Gln Arg Leu Ile Thr Phe Glu

275

280

285

Ser Glu Asn Ile Asn Leu Lys Lys Arg Pro Asn Asp Ala Val Ser Asn  
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Arg Asp Lys Lys Lys Asn Ser Glu Thr Ala Lys Thr Asp Glu Val Glu  
 305 310 315 320

Lys Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln  
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Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Arg Lys Ala  
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Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu  
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Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala  
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Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr Lys Val  
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Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu  
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Lys Gln Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln  
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Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala  
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Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu  
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Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr  
 485 490 495

Lys Val Ala Glu Ala Glu Lys Asp Ile Asp Pro Met Gly Ala Cys Gly  
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Ser Lys Asp Ser Thr Ser Asp Lys Gly Leu Ala Ser Asp Lys Asp Gly

515

520

525

Lys Asn Ala Lys Asp Arg Lys Glu Ala Trp Glu Arg Ile Arg Gln Ala  
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Ile Pro Arg Glu Lys Thr Ala Glu Ala Lys Gln Arg Arg Ile Glu Leu  
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Phe Lys Lys Phe Asp Lys Asn Glu Thr Gly Lys Leu Cys Tyr Asp Glu  
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Val His Ser Gly Cys Leu Glu Val Leu Lys Leu Asp Glu Phe Thr Pro  
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Arg Val Arg Asp Ile Thr Lys Arg Ala Phe Asp Lys Ala Arg Ala Leu  
 595 600 605

Gly Ser Lys Leu Glu Asn Lys Gly Ser Glu Asp Phe Val Glu Phe Leu  
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Glu Phe Arg Leu Met Leu Cys Tyr Ile Tyr Asp Phe Phe Glu Leu Thr  
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Val Met Phe Asp Glu Ile Asp Ala Ser Gly Asn Met Leu Val Asp Glu  
 645 650 655

Glu Glu Phe Lys Arg Ala Val Pro Lys Leu Glu Ala Trp Gly Ala Lys  
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Val Glu Asp Pro Ala Ala Leu Phe Lys Glu Leu Asp Lys Asn Gly Thr  
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<211> 1836

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gcg Ala	aag Lys	gag Glu	atc Ile 20	gct Ala	gcg Ala	ctt Leu	gag Glu	gag Glu 25	agc Ser	atg Met	aat Asn	gcc Ala	cgc Arg 30	gca Ala	cag Gln	96
gag Glu	ctg Leu	gca Ala 35	cgc Arg	gag Glu	aag Lys	aag Lys	ctt Leu 40	gct Ala	gac Asp	cgc Arg	gcg Ala	ttc Phe 45	ctc Leu	gac Asp	cag Gln	144
aag Lys	ccg Pro 50	gag Glu	ggc Gly	gtg Val	ccg Pro	ctg Leu 55	cga Arg	gag Glu	ctg Leu	ccg Pro	ctc Leu 60	gac Asp	gac Asp	gac Asp	agc Ser	192
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ccg Pro	cgc Arg	agg Arg	aac Asn 85	gcg Ala	aag Lys	gag Glu	atc Ile	gct Ala 90	gcg Ala	ctt Leu	gag Glu	gag Glu	agc Ser 95	atg Met	aat Asn	288
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gac Asp	gac Asp 130	gac Asp	agc Ser	gac Asp	ttt Phe	gtt Val 135	gct Ala	atg Met	gag Glu	cag Gln	gag Glu 140	cgc Arg	agg Arg	cag Gln	ctg Leu	432
ctc Leu 145	gag Glu	aag Lys	gac Asp	ccg Pro 150	cgc Arg	agg Arg	aac Asn	gcg Ala	aag Lys	gag Glu 155	atc Ile	gct Ala	gcg Ala	ctt Leu	gag Glu 160	480
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Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly	
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gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc gac ttt gtt gct	816
Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala	
260 265 270	
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Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn	
275 280 285	
gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag	912
Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln	
290 295 300	
gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag	960
Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln	
305 310 315 320	
aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc	1008
Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser	
325 330 335	
gac ttt gtt gct atg gag cag gag cgc agg cag ctg ctc gag aag gac	1056
Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp	
340 345 350	
ccg cgc agg aac gcg aag gag atc gct gcg ctt gag gag agc atg aat	1104
Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn	
355 360 365	
gcc cgc gca cag gag ctg gca cgc gag aag aag ctt gct gac cgc gcg	1152
Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala	
370 375 380	
ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc	1200
Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu	
385 390 395 400	
gac gac gac agc gac ttt gtt gct atg gag cag gag cgc agg cag ctg	1248
Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu Arg Arg Gln Leu	
405 410 415	
ctc gag aag gac ccg cgc agg aac gcg aag gag atc gct gcg ctt gag	1296
Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile Ala Ala Leu Glu	
420 425 430	
gag agc atg aat gcc cgc gca cag gag ctg gca cgc gag aag aag ctt	1344
Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg Glu Lys Lys Leu	
435 440 445	
gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc gtg ccg ctg cga	1392
Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly Val Pro Leu Arg	
450 455 460	
gag ctg ccg ctc gac gac gac agc gac ttt gtt gct atg gag cag gag	1440
Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala Met Glu Gln Glu	
465 470 475 480	



cgc agg cag ctg ctc gag aag gac ccg cgc agg aac gcg aag gag atc	1488
Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn Ala Lys Glu Ile	
485 490 495	
gct gcg ctt gag gag agc atg aat gcc cgc gca cag gag ctg gca cgc	1536
Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln Glu Leu Ala Arg	
500 505 510	
gag aag aag ctt gct gac cgc gcg ttc ctc gac cag aag ccg gag ggc	1584
Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln Lys Pro Glu Gly	
515 520 525	
gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc gac ttt gtt gct	1632
Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser Asp Phe Val Ala	
530 535 540	
atg gag cag gag cgc agg cag ctg ctc gag aag gac ccg cgc agg aac	1680
Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn	
545 550 555 560	
gcg aag gag atc gct gcg ctt gag gag agc atg aat gcc cgc gca cag	1728
Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln	
565 570 575	
gag ctg gca cgc gag aag aag ctt gct gac cgc gcg ttc ctc gac cag	1776
Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln	
580 585 590	
aag ccg gag ggc gtg ccg ctg cga gag ctg ccg ctc gac gac gac agc	1824
Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser	
595 600 605	
gac ttt gtt gct	1836
Asp Phe Val Ala	
610	

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 <212> PRT  
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Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln	
35 40 45	
Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser	
50 55 60	

Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	65	70	75	80
Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	85	90	95	
Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	100	105	110	
Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	115	120	125	
Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	130	135	140	
Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	145	150	155	160
Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	165	170	175	
Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	180	185	190	
Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	195	200	205	
Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	210	215	220	
Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	225	230	235	240
Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	245	250	255	
Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	260	265	270	
Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	275	280	285	
Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	290	295	300	

Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	305	310	315	320
Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	325	330	335	
Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	340	345	350	
Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	355	360	365	
Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	370	375	380	
Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	385	390	395	400
Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	405	410	415	
Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	420	425	430	
Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	435	440	445	
Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	450	455	460	
Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	465	470	475	480
Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	485	490	495	
Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	500	505	510	
Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	515	520	525	
Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	530	535	540	

Met Glu Gln Glu Arg Arg Gln Leu Leu Glu Lys Asp Pro Arg Arg Asn  
 545 550 555 560

Ala Lys Glu Ile Ala Ala Leu Glu Glu Ser Met Asn Ala Arg Ala Gln  
 565 570 575

Glu Leu Ala Arg Glu Lys Lys Leu Ala Asp Arg Ala Phe Leu Asp Gln  
 580 585 590

Lys Pro Glu Gly Val Pro Leu Arg Glu Leu Pro Leu Asp Asp Asp Ser  
 595 600 605

Asp Phe Val Ala  
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 cat att gca aat aat aaa caa aaa aca aca ctc gaa aaa act caa aca 96  
 His Ile Ala Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr  
 20 25 30  
 gaa caa aaa aca gcg cca ttt gga cag ggc gca gca ggg tgg aca aaa 144  
 Glu Gln Lys Thr Ala Pro Phe Gly Gln Gly Ala Ala Gly Trp Thr Lys  
 35 40 45  
 cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 192  
 Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
 50 55 60  
 gga cag gcc gca gca ggt gac aaa cca cca cca ttt gga cag gcc gca 240  
 Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe Gly Gln Ala Ala  
 65 70 75 80  
 gca ggt gac aaa cca tca cta ttt gga cag gcc gca gca ggt gac aaa 288  
 Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala Ala Gly Asp Lys  
 85 90 95  
 cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt 336  
 Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe  
 100 105 110  
 gga cag gcc gca gca ggt gac aaa cca tca cta ttt gga cag gcc gca 384

Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala		
		115					120					125					
gca	ggt	gac	aaa	cca	tca	cca	ttt	gga	cag	gcc	gca	gca	ggt	gac	aaa		432
Ala	Gly	Asp	Lys	Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys		
		130					135				140						
cca	cca	cca	ttt	gga	cag	gcc	gca	gca	ggt	gac	aaa	cca	cca	cca	ttt		480
Pro	Pro	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe		
		145			150					155					160		
gga	cag	gcc	gca	gca	ggt	gac	aaa	cca	tca	cta	ttt	gga	cag	gcc	gca		528
Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala		
				165					170					175			
gca	ggt	gac	aaa	cca	tca	cca	ttt	gga	cag	gga	act	gcg	ttt	gat	gcc		576
Ala	Gly	Asp	Lys	Pro	Ser	Pro	Phe	Gly	Gln	Gly	Thr	Ala	Phe	Asp	Ala		
			180					185					190				
tct	cga	agc	act	gtg	ttt	gcg	aat	gcg	cct	ggt	gtt	gcc	cag	gtg			621
Ser	Arg	Ser	Thr	Val	Phe	Ala	Asn	Ala	Pro	Gly	Val	Ala	Gln	Val			
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<400> 40

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His	Ile	Ala	Asn	Asn	Lys	Gln	Lys	Thr	Thr	Leu	Glu	Lys	Thr	Gln	Thr		
			20					25					30				

Glu	Gln	Lys	Thr	Ala	Pro	Phe	Gly	Gln	Gly	Ala	Ala	Gly	Trp	Thr	Lys		
		35					40					45					

Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe		
	50					55					60						

Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe	Gly	Gln	Ala	Ala		
65					70				75					80			

Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys		
			85					90						95			

Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe		
			100					105					110				

Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala		
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--	--

115	120	125
Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys		
130	135	140
Pro Pro Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe		
145	150	155
Gly Gln Ala Ala Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala		
165	170	175
Ala Gly Asp Lys Pro Ser Pro Phe Gly Gln Gly Thr Ala Phe Asp Ala		
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Ser Arg Ser Thr Val Phe Ala Asn Ala Pro Gly Val Ala Gln Val		
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1 5 10 15	
cat att gca aat aat aaa caa aaa aca aca ctc gaa aaa act caa aca	96
His Ile Ala Asn Asn Lys Gln Lys Thr Thr Leu Glu Lys Thr Gln Thr	
20 25 30	
gaa caa aaa aca gcg cca ttt gga cag ggc gca gca ggg tgg aca aaa	144
Glu Gln Lys Thr Ala Pro Phe Gly Gln Gly Ala Ala Gly Trp Thr Lys	
35 40 45	
cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt	192
Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe	
50 55 60	
gga cag gcc gca gca ggt gac aaa cca cca cca ttt gga cag gcc gca	240
Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe Gly Gln Ala Ala	
65 70 75 80	
gca ggt gac aaa cca tca cta ttt gga cag gcc gca gca ggt gac aaa	288
Ala Gly Asp Lys Pro Ser Leu Phe Gly Gln Ala Ala Ala Gly Asp Lys	
85 90 95	
cca tca cca ttt gga cag gcc gca gca ggt gac aaa cca cca cca ttt	336
Pro Ser Pro Phe Gly Gln Ala Ala Ala Gly Asp Lys Pro Pro Pro Phe	

100								105				110				
gga	cag	gcc	gca	gca	ggt	gac	aaa	cca	tca	cta	ttt	gga	cag	gcc	gca	384
Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala	
		115					120					125				
gca	ggt	gac	aaa	cca	tca	cca	ttt	gga	cag	gcc	gca	gca	ggt	gac	aaa	432
Ala	Gly	Asp	Lys	Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	
	130					135					140					
cca	cca	cca	ttt	gga	cag	gcc	gca	gca	ggt	gac	aaa	cca	cca	cca	ttt	480
Pro	Pro	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe	
					150					155					160	
gga	cag	gcc	gca	gca	ggt	gac	aaa	cca	tca	cta	ttt	gga	cag	gcc	gca	528
Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala	
			165						170					175		
gca	ggt	gac	aaa	cca	tca	cca	ttt	gga	cag	gga	act	gcg	ttt	gat	gcc	576
Ala	Gly	Asp	Lys	Pro	Ser	Pro	Phe	Gly	Gln	Gly	Thr	Ala	Phe	Asp	Ala	
		180					185						190			
tct	cga	agc	act	gtg	ttt	gcg	aat	gcg	cct	ggt	gtt	gcc	cag	gtg	atg	624
Ser	Arg	Ser	Thr	Val	Phe	Ala	Asn	Ala	Pro	Gly	Val	Ala	Gln	Val	Met	
		195					200					205				
gag	cag	gag	cgc	agg	cag	ctg	ctc	gag	aag	gac	ccg	cgc	agg	aac	gcg	672
Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	
	210					215					220					
aag	gag	atc	gct	gcg	ctt	gag	gag	agc	atg	aat	gcc	cgc	gca	cag	gag	720
Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	
	225				230					235				240		
ctg	gca	cgc	gag	aag	aag	ctt	gct	gac	cgc	gcg	ttc	ctc	gac	cag	aag	768
Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	
				245					250					255		
ccg	gag	ggc	gtg	ccg	ctg	cga	gag	ctg	ccg	ctc	gac	gac	gac	agc	gac	816
Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	
			260						265				270			
ttt	gtt	gct	atg	gag	cag	gag	cgc	agg	cag	ctg	ctc	gag	aag	gac	ccg	864
Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	
		275					280						285			
cgc	agg	aac	gcg	aag	gag	atc	gct	gcg	ctt	gag	gag	agc	atg	aat	gcc	912
Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	
	290					295					300					
cgc	gca	cag	gag	ctg	gca	cgc	gag	aag	aag	ctt	gct	gac	cgc	gcg	ttc	960
Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	
	305				310					315				320		
ctc	gac	cag	aag	ccg	gag	ggc	gtg	ccg	ctg	cga	gag	ctg	ccg	ctc	gac	1008
Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	
				325					330				335			
gac	gac	agc	gac	ttt	gtt	gct	atg	gag	cag	gag	cgc	agg	cag	ctg	ctc	1056
Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	

340								345				350						
gag	aag	gac	ccg	cgc	agg	aac	gcg	aag	gag	atc	gct	gcg	ctt	gag	gag	1104		
Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu			
		355					360					365						
agc	atg	aat	gcc	cgc	gca	cag	gag	ctg	gca	cgc	gag	aag	aag	ctt	gct	1152		
Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala			
	370					375					380							
gac	cgc	gcg	ttc	ctc	gac	cag	aag	ccg	gag	ggc	gtg	ccg	ctg	cga	gag	1200		
Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu			
385					390					395					400			
ctg	ccg	ctc	gac	gac	gac	agc	gac	ttt	gtt	gct	atg	gag	cag	gag	cgc	1248		
Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg			
			405					410					415					
agg	cag	ctg	ctc	gag	aag	gac	ccg	cgc	agg	aac	gcg	aag	gag	atc	gct	1296		
Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala			
		420					425				430							
gcg	ctt	gag	gag	agc	atg	aat	gcc	cgc	gca	cag	gag	ctg	gca	cgc	gag	1344		
Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu			
	435						440				445							
aag	aag	ctt	gct	gac	cgc	gcg	ttc	ctc	gac	cag	aag	ccg	gag	ggc	gtg	1392		
Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val			
	450					455				460								
ccg	ctg	cga	gag	ctg	ccg	ctc	gac	gac	gac	agc	gac	ttt	gtt	gct	atg	1440		
Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met			
465					470					475					480			
gag	cag	gag	cgc	agg	cag	ctg	ctc	gag	aag	gac	ccg	cgc	agg	aac	gcg	1488		
Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala			
			485					490					495					
aag	gag	atc	gct	gcg	ctt	gag	gag	agc	atg	aat	gcc	cgc	gca	cag	gag	1536		
Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu			
		500					505				510							
ctg	gca	cgc	gag	aag	aag	ctt	gct	gac	cgc	gcg	ttc	ctc	gac	cag	aag	1584		
Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys			
	515					520					525							
ccg	gag	ggc	gtg	ccg	ctg	cga	gag	ctg	ccg	ctc	gac	gac	gac	agc	gac	1632		
Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp			
	530					535					540							
ttt	gtt	gct	atg	gag	cag	gag	cgc	agg	cag	ctg	ctc	gag	aag	gac	ccg	1680		
Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro			
545					550				555						560			
cgc	agg	aac	gcg	aag	gag	atc	gct	gcg	ctt	gag	gag	agc	atg	aat	gcc	1728		
Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala			
			565				570						575					
cgc	gca	cag	gag	ctg	gca	cgc	gag	aag	aag	ctt	gct	gac	cgc	gcg	ttc	1776		
Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe			



580								585				590				
ctc	gac	cag	aag	ccg	gag	ggc	gtg	ccg	ctg	cga	gag	ctg	ccg	ctc	gac	1824
Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	
		595					600					605				

gac	gac	agc	gac	ttt	gtt	gct										1845
Asp	Asp	Ser	Asp	Phe	Val	Ala										
	610					615										

<210> 42  
 <211> 615  
 <212> PRT  
 <213> T CRUZI

<400> 42

Phe	Asn	Pro	Ser	Thr	Asp	Lys	Leu	Lys	Leu	Asn	Gln	Gln	Asn	Lys	Pro
1				5					10					15	

His	Ile	Ala	Asn	Asn	Lys	Gln	Lys	Thr	Thr	Leu	Glu	Lys	Thr	Gln	Thr
			20					25						30	

Glu	Gln	Lys	Thr	Ala	Pro	Phe	Gly	Gln	Gly	Ala	Ala	Gly	Trp	Thr	Lys
		35					40					45			

Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe
	50					55					60				

Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe	Gly	Gln	Ala	Ala
65					70					75					80

Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys
				85					90					95	

Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe
			100					105					110		

Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala
		115					120					125			

Ala	Gly	Asp	Lys	Pro	Ser	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys
	130					135					140				

Pro	Pro	Pro	Phe	Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Pro	Pro	Phe
145					150					155					160

Gly	Gln	Ala	Ala	Ala	Gly	Asp	Lys	Pro	Ser	Leu	Phe	Gly	Gln	Ala	Ala
				165					170					175	

Ala	Gly	Asp	Lys	Pro	Ser	Pro	Phe	Gly	Gln	Gly	Thr	Ala	Phe	Asp	Ala		
			180					185					190				
Ser	Arg	Ser	Thr	Val	Phe	Ala	Asn	Ala	Pro	Gly	Val	Ala	Gln	Val	Met		
		195					200					205					
Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala		
	210					215					220						
Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu		
225					230					235					240		
Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys		
				245					250					255			
Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp		
			260					265					270				
Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro		
		275					280					285					
Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala		
	290					295					300						
Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe		
305				310						315					320		
Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp		
				325					330					335			
Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu		
			340					345					350				
Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu		
		355					360					365					
Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala		
	370					375					380						
Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu		
385					390					395					400		
Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	Glu	Gln	Glu	Arg		
			405					410						415			

Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	
			420					425					430			
Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	
		435					440					445				
Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	
	450					455					460					
Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	Phe	Val	Ala	Met	
465					470					475					480	
Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	Arg	Arg	Asn	Ala	
				485					490					495		
Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	Arg	Ala	Gln	Glu	
			500					505					510			
Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	Leu	Asp	Gln	Lys	
		515					520					525				
Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	Asp	Asp	Ser	Asp	
	530					535					540					
Phe	Val	Ala	Met	Glu	Gln	Glu	Arg	Arg	Gln	Leu	Leu	Glu	Lys	Asp	Pro	
545					550				555						560	
Arg	Arg	Asn	Ala	Lys	Glu	Ile	Ala	Ala	Leu	Glu	Glu	Ser	Met	Asn	Ala	
			565						570					575		
Arg	Ala	Gln	Glu	Leu	Ala	Arg	Glu	Lys	Lys	Leu	Ala	Asp	Arg	Ala	Phe	
			580					585					590			
Leu	Asp	Gln	Lys	Pro	Glu	Gly	Val	Pro	Leu	Arg	Glu	Leu	Pro	Leu	Asp	
	595						600					605				
Asp	Asp	Ser	Asp	Phe	Val	Ala										
	610					615										

<210> 43  
 <211> 858  
 <212> DNA  
 <213> T CRUZI

<220>  
 <221> CDS

<222> (1) .. (858)

<400> 43

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Asp Pro Thr Tyr Arg Phe Ala Asn His Ala Phe Thr Leu Val Ala Ser	
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gtg acg att cac gag gtt ccg agc gtc gcg agt cct ttg ctg ggt gcg	96
Val Thr Ile His Glu Val Pro Ser Val Ala Ser Pro Leu Leu Gly Ala	
20 25 30	
agc ctg gac tct tct ggt ggc aaa aaa ctc ctg ggg ctc tcg tac gac	144
Ser Leu Asp Ser Ser Gly Gly Lys Lys Leu Leu Gly Leu Ser Tyr Asp	
35 40 45	
gag aag cac cag tgg cag cca ata tac gga tca acg ccg gtg acg ccg	192
Glu Lys His Gln Trp Gln Pro Ile Tyr Gly Ser Thr Pro Val Thr Pro	
50 55 60	
acc gga tcg tgg gag atg ggt aag agg tac cac gtg gtt ctt acg atg	240
Thr Gly Ser Trp Glu Met Gly Lys Arg Tyr His Val Val Leu Thr Met	
65 70 75 80	
gcg aat aaa att ggc tcc gtg tac att gat gga gaa cct ctg gag ggt	288
Ala Asn Lys Ile Gly Ser Val Tyr Ile Asp Gly Glu Pro Leu Glu Gly	
85 90 95	
tca ggg cag acc gtt gtg cca gac gag agg acg cct gac atc tcc cac	336
Ser Gly Gln Thr Val Val Pro Asp Glu Arg Thr Pro Asp Ile Ser His	
100 105 110	
ttc tac gtt ggc ggg tat gga agg agt gat atg cca acc ata agc cac	384
Phe Tyr Val Gly Gly Tyr Gly Arg Ser Asp Met Pro Thr Ile Ser His	
115 120 125	
gtg acg gtg aat aat gtt ctt ctt tac aac cgt cag ctg aat gcc gag	432
Val Thr Val Asn Asn Val Leu Leu Tyr Asn Arg Gln Leu Asn Ala Glu	
130 135 140	
gag atc agg acc ttg ttc ttg agc cag gac ctg att ggc acg gaa gca	480
Glu Ile Arg Thr Leu Phe Leu Ser Gln Asp Leu Ile Gly Thr Glu Ala	
145 150 155 160	
cac atg ggc agc agc agc ggc agc agt gcc cac ggt acg ccc tcg att	528
His Met Gly Ser Ser Ser Gly Ser Ser Ala His Gly Thr Pro Ser Ile	
165 170 175	
ccc gtt gac agc agt gcc cac ggt aca ccc tcg act ccc gtt gac agc	576
Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser	
180 185 190	
agt gcc cac ggt acg ccc tcg act ccc gtt gac agc agt gcc cac ggt	624
Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly	
195 200 205	
aca ccc tcg act ccc gtt gac agc agt gcc cac ggt aca ccc tcg act	672
Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr	
210 215 220	
ccc gtt gac agc agt gcc cac ggt aag ccc tcg act ccc gct gac agc	720

Pro	Val	Asp	Ser	Ser	Ala	His	Gly	Lys	Pro	Ser	Thr	Pro	Ala	Asp	Ser	
225					230					235					240	
agt	gcc	cac	agt	acg	ccc	tcg	act	ccc	gct	gac	agc	agt	gcc	cac	agt	768
Ser	Ala	His	Ser	Thr	Pro	Ser	Thr	Pro	Ala	Asp	Ser	Ser	Ala	His	Ser	
				245					250					255		
acg	ccc	tca	att	ccc	gct	gac	agc	agt	gcc	cac	agt	acg	ccc	tca	gct	816
Thr	Pro	Ser	Ile	Pro	Ala	Asp	Ser	Ser	Ala	His	Ser	Thr	Pro	Ser	Ala	
			260					265					270			
ccc	gct	gac	aac	ggc	gcc	aat	ggt	acg	gtt	ttg	att	ttg	tcg			858
Pro	Ala	Asp	Asn	Gly	Ala	Asn	Gly	Thr	Val	Leu	Ile	Leu	Ser			
		275					280					285				

<210> 44  
 <211> 286  
 <212> PRT  
 <213> T CRUZI

<400> 44

Asp	Pro	Thr	Tyr	Arg	Phe	Ala	Asn	His	Ala	Phe	Thr	Leu	Val	Ala	Ser
1				5					10					15	

Val	Thr	Ile	His	Glu	Val	Pro	Ser	Val	Ala	Ser	Pro	Leu	Leu	Gly	Ala
			20					25					30		

Ser	Leu	Asp	Ser	Ser	Gly	Gly	Lys	Lys	Leu	Leu	Gly	Leu	Ser	Tyr	Asp
		35					40					45			

Glu	Lys	His	Gln	Trp	Gln	Pro	Ile	Tyr	Gly	Ser	Thr	Pro	Val	Thr	Pro
	50					55					60				

Thr	Gly	Ser	Trp	Glu	Met	Gly	Lys	Arg	Tyr	His	Val	Val	Leu	Thr	Met
65					70					75					80

Ala	Asn	Lys	Ile	Gly	Ser	Val	Tyr	Ile	Asp	Gly	Glu	Pro	Leu	Glu	Gly
				85					90					95	

Ser	Gly	Gln	Thr	Val	Val	Pro	Asp	Glu	Arg	Thr	Pro	Asp	Ile	Ser	His
			100					105					110		

Phe	Tyr	Val	Gly	Gly	Tyr	Gly	Arg	Ser	Asp	Met	Pro	Thr	Ile	Ser	His
		115					120					125			

Val	Thr	Val	Asn	Asn	Val	Leu	Leu	Tyr	Asn	Arg	Gln	Leu	Asn	Ala	Glu
	130					135					140				

Glu	Ile	Arg	Thr	Leu	Phe	Leu	Ser	Gln	Asp	Leu	Ile	Gly	Thr	Glu	Ala
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

145 150 155 160

His Met Gly Ser Ser Ser Gly Ser Ser Ala His Gly Thr Pro Ser Ile  
165 170 175

Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser  
180 185 190

Ser Ala His Gly Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly  
195 200 205

Thr Pro Ser Thr Pro Val Asp Ser Ser Ala His Gly Thr Pro Ser Thr  
210 215 220

Pro Val Asp Ser Ser Ala His Gly Lys Pro Ser Thr Pro Ala Asp Ser  
225 230 235 240

Ser Ala His Ser Thr Pro Ser Thr Pro Ala Asp Ser Ser Ala His Ser  
245 250 255

Thr Pro Ser Ile Pro Ala Asp Ser Ser Ala His Ser Thr Pro Ser Ala  
260 265 270

Pro Ala Asp Asn Gly Ala Asn Gly Thr Val Leu Ile Leu Ser  
275 280 285

<210> 45  
<211> 701  
<212> DNA  
<213> T CRUZI

<220>  
<221> CDS  
<222> (1)..(699)

<400> 45  
act cat gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc 48  
Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala  
1 5 10 15  
  
ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc 96  
Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro  
20 25 30  
  
gac cac ttc cgc tcg acc tcg acg act cat gac gcg tac agg ccc gtt 144  
Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val  
35 40 45  
  
gat ccc tcg gcg tac aag cgc gcc ttg ccg cag gaa gag caa gag gat 192  
Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp

50	55	60	
gtg ggg ccg cgc cac gtt gat ccc gac cac ttc cgc tcg acg act cat			240
Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His			
65	70	75	80
gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg			288
Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro			
	85	90	95
cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac			336
Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His			
	100	105	110
ttc cgc tcg acc tcg acg act cat gac gcg tac agg ccc gtt gat ccc			384
Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro			
	115	120	125
tcg gcg tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg			432
Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly			
	130	135	140
ccg cgc cac gtt gat ccc gac cac ttc cgc tcg acc tcg acg act cat			480
Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His			
	145	150	155
gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg			528
Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro			
	165	170	175
cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac			576
Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His			
	180	185	190
ttc cgc tcg acg act cat gac gcg tac agg ccc gtt gat ccc tcg gcg			624
Phe Arg Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala			
	195	200	205
tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc			672
Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg			
	210	215	220
cac gtt gat ccc gac cac ttc cgc tcg ac			701
His Val Asp Pro Asp His Phe Arg Ser			
225	230		

<210> 46  
 <211> 233  
 <212> PRT  
 <213> T CRUZI

<400> 46

Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala
1 5 10 15

Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro
20 25 30

Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val  
35 40 45

Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp  
50 55 60

Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His  
65 70 75 80

Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
85 90 95

Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
100 105 110

Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro  
115 120 125

Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly  
130 135 140

Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His  
145 150 155 160

Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro  
165 170 175

Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His  
180 185 190

Phe Arg Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala  
195 200 205

Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg  
210 215 220

His Val Asp Pro Asp His Phe Arg Ser  
225 230

<210> 47  
<211> 1557  
<212> DNA  
<213> T CRUZI

<220>



<221> CDS

<222> (1)..(1557)

<400> 47

gat	cca	acg	tat	cgt	ttt	gca	aac	cac	gcg	ttc	acg	ctg	gtg	gcg	tcg	48
Asp	Pro	Thr	Tyr	Arg	Phe	Ala	Asn	His	Ala	Phe	Thr	Leu	Val	Ala	Ser	
1				5					10					15		

gtg	acg	att	cac	gag	gtt	ccg	agc	gtc	gcg	agt	cct	ttg	ctg	ggg	gcg	96
Val	Thr	Ile	His	Glu	Val	Pro	Ser	Val	Ala	Ser	Pro	Leu	Leu	Gly	Ala	
			20					25					30			

agc	ctg	gac	tct	tct	ggg	ggc	aaa	aaa	ctc	ctg	ggg	ctc	tcg	tac	gac	144
Ser	Leu	Asp	Ser	Ser	Gly	Gly	Lys	Lys	Leu	Leu	Gly	Leu	Ser	Tyr	Asp	
		35					40					45				

gag	aag	cac	cag	tgg	cag	cca	ata	tac	gga	tca	acg	ccg	gtg	acg	ccg	192
Glu	Lys	His	Gln	Trp	Gln	Pro	Ile	Tyr	Gly	Ser	Thr	Pro	Val	Thr	Pro	
	50					55					60					

acc	gga	tcg	tgg	gag	atg	ggg	aag	agg	tac	cac	gtg	gtt	ctt	acg	atg	240
Thr	Gly	Ser	Trp	Glu	Met	Gly	Lys	Arg	Tyr	His	Val	Val	Leu	Thr	Met	
65					70				75						80	

gcg	aat	aaa	att	ggc	tcc	gtg	tac	att	gat	gga	gaa	cct	ctg	gag	ggg	288
Ala	Asn	Lys	Ile	Gly	Ser	Val	Tyr	Ile	Asp	Gly	Glu	Pro	Leu	Glu	Gly	
				85					90					95		

tca	ggg	cag	acc	gtt	gtg	cca	gac	gag	agg	acg	cct	gac	atc	tcc	cac	336
Ser	Gly	Gln	Thr	Val	Val	Pro	Asp	Glu	Arg	Thr	Pro	Asp	Ile	Ser	His	
			100					105					110			

ttc	tac	gtt	ggc	ggg	tat	gga	agg	agt	gat	atg	cca	acc	ata	agc	cac	384
Phe	Tyr	Val	Gly	Gly	Tyr	Gly	Arg	Ser	Asp	Met	Pro	Thr	Ile	Ser	His	
		115					120						125			

gtg	acg	gtg	aat	aat	gtt	ctt	ctt	tac	aac	cgt	cag	ctg	aat	gcc	gag	432
Val	Thr	Val	Asn	Asn	Val	Leu	Leu	Tyr	Asn	Arg	Gln	Leu	Asn	Ala	Glu	
	130					135					140					

gag	atc	agg	acc	ttg	ttc	ttg	agc	cag	gac	ctg	att	ggc	acg	gaa	gca	480
Glu	Ile	Arg	Thr	Leu	Phe	Leu	Ser	Gln	Asp	Leu	Ile	Gly	Thr	Glu	Ala	
145					150					155					160	

cac	atg	ggc	agc	agc	agc	ggc	agc	agt	gcc	cac	ggg	acg	ccc	tcg	att	528
His	Met	Gly	Ser	Ser	Ser	Gly	Ser	Ser	Ala	His	Gly	Thr	Pro	Ser	Ile	
				165					170					175		

ccc	gtt	gac	agc	agt	gcc	cac	ggg	aca	ccc	tcg	act	ccc	gtt	gac	agc	576
Pro	Val	Asp	Ser	Ser	Ala	His	Gly	Thr	Pro	Ser	Thr	Pro	Val	Asp	Ser	
			180					185					190			

agt	gcc	cac	ggg	acg	ccc	tcg	act	ccc	gtt	gac	agc	agt	gcc	cac	ggg	624
Ser	Ala	His	Gly	Thr	Pro	Ser	Thr	Pro	Val	Asp	Ser	Ser	Ala	His	Gly	
		195					200					205				

aca	ccc	tcg	act	ccc	gtt	gac	agc	agt	gcc	cac	ggg	aca	ccc	tcg	act	672
Thr	Pro	Ser	Thr	Pro	Val	Asp	Ser	Ser	Ala	His	Gly	Thr	Pro	Ser	Thr	
	210					215					220					

ccc gtt gac agc agt gcc cac ggt aag ccc tcg act ccc gct gac agc Pro Val Asp Ser Ser Ala His Gly Lys Pro Ser Thr Pro Ala Asp Ser 225 230 235 240	720
agt gcc cac agt acg ccc tcg act ccc gct gac agc agt gcc cac agt Ser Ala His Ser Thr Pro Ser Thr Pro Ala Asp Ser Ser Ala His Ser 245 250 255	768
acg ccc tca att ccc gct gac agc agt gcc cac agt acg ccc tca gct Thr Pro Ser Ile Pro Ala Asp Ser Ser Ala His Ser Thr Pro Ser Ala 260 265 270	816
ccc gct gac aac ggc gcc aat ggt acg gtt ttg att ttg tcg act cat Pro Ala Asp Asn Gly Ala Asn Gly Thr Val Leu Ile Leu Ser Thr His 275 280 285	864
gac gcg tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro 290 295 300	912
cag gaa gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His 305 310 315 320	960
ttc cgc tcg acc tcg acg act cat gac gcg tac agg ccc gtt gat ccc Phe Arg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro 325 330 335	1008
tcg gcg tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly 340 345 350	1056
ccg cgc cac gtt gat ccc gac cac ttc cgc tcg acg act cat gac gcg Pro Arg His Val Asp Pro Asp His Phe Arg Ser Thr Thr His Asp Ala 355 360 365	1104
tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg cag gaa Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu 370 375 380	1152
gag caa gag gat gtg ggg ccg cgc cac gtt gat ccc gac cac ttc cgc Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg 385 390 395 400	1200
tcg acc tcg acg act cat gac gcg tac agg ccc gtt gat ccc tcg gcg Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala 405 410 415	1248
tac aag cgc gcc ttg ccg cag gaa gag caa gag gat gtg ggg ccg cgc Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg 420 425 430	1296
cac gtt gat ccc gac cac ttc cgc tcg acc tcg acg act cat gac gcg His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala 435 440 445	1344
tac agg ccc gtt gat ccc tcg gcg tac aag cgc gcc ttg ccg cag gaa Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu 450 455 460	1392

gag	caa	gag	gat	gtg	ggg	ccg	cgc	cac	gtt	gat	ccc	gac	cac	ttc	cgc	1440
Glu	Gln	Glu	Asp	Val	Gly	Pro	Arg	His	Val	Asp	Pro	Asp	His	Phe	Arg	
465					470					475					480	
tcg	acg	act	cat	gac	gcg	tac	agg	ccc	gtt	gat	ccc	tcg	gcg	tac	aag	1488
Ser	Thr	Thr	His	Asp	Ala	Tyr	Arg	Pro	Val	Asp	Pro	Ser	Ala	Tyr	Lys	
				485					490						495	
cgc	gcc	ttg	ccg	cag	gaa	gag	caa	gag	gat	gtg	ggg	ccg	cgc	cac	gtt	1536
Arg	Ala	Leu	Pro	Gln	Glu	Glu	Gln	Glu	Asp	Val	Gly	Pro	Arg	His	Val	
			500						505						510	
gat	ccc	gac	cac	ttc	cgc	tcg										1557
Asp	Pro	Asp	His	Phe	Arg	Ser										
			515													

<210> 48  
 <211> 519  
 <212> PRT  
 <213> T CRUZI

<400> 48

Asp	Pro	Thr	Tyr	Arg	Phe	Ala	Asn	His	Ala	Phe	Thr	Leu	Val	Ala	Ser	
1				5					10					15		
Val	Thr	Ile	His	Glu	Val	Pro	Ser	Val	Ala	Ser	Pro	Leu	Leu	Gly	Ala	
			20					25					30			
Ser	Leu	Asp	Ser	Ser	Gly	Gly	Lys	Lys	Leu	Leu	Gly	Leu	Ser	Tyr	Asp	
		35					40					45				
Glu	Lys	His	Gln	Trp	Gln	Pro	Ile	Tyr	Gly	Ser	Thr	Pro	Val	Thr	Pro	
	50					55					60					
Thr	Gly	Ser	Trp	Glu	Met	Gly	Lys	Arg	Tyr	His	Val	Val	Leu	Thr	Met	
65					70					75					80	
Ala	Asn	Lys	Ile	Gly	Ser	Val	Tyr	Ile	Asp	Gly	Glu	Pro	Leu	Glu	Gly	
				85					90					95		
Ser	Gly	Gln	Thr	Val	Val	Pro	Asp	Glu	Arg	Thr	Pro	Asp	Ile	Ser	His	
			100					105					110			
Phe	Tyr	Val	Gly	Gly	Tyr	Gly	Arg	Ser	Asp	Met	Pro	Thr	Ile	Ser	His	
		115					120					125				
Val	Thr	Val	Asn	Asn	Val	Leu	Leu	Tyr	Asn	Arg	Gln	Leu	Asn	Ala	Glu	
		130				135					140					

Glu	Ile	Arg	Thr	Leu	Phe	Leu	Ser	Gln	Asp	Leu	Ile	Gly	Thr	Glu	Ala	145	150	155	160
His	Met	Gly	Ser	Ser	Ser	Gly	Ser	Ser	Ala	His	Gly	Thr	Pro	Ser	Ile	165	170	175	
Pro	Val	Asp	Ser	Ser	Ala	His	Gly	Thr	Pro	Ser	Thr	Pro	Val	Asp	Ser	180	185	190	
Ser	Ala	His	Gly	Thr	Pro	Ser	Thr	Pro	Val	Asp	Ser	Ser	Ala	His	Gly	195	200	205	
Thr	Pro	Ser	Thr	Pro	Val	Asp	Ser	Ser	Ala	His	Gly	Thr	Pro	Ser	Thr	210	215	220	
Pro	Val	Asp	Ser	Ser	Ala	His	Gly	Lys	Pro	Ser	Thr	Pro	Ala	Asp	Ser	225	230	235	240
Ser	Ala	His	Ser	Thr	Pro	Ser	Thr	Pro	Ala	Asp	Ser	Ser	Ala	His	Ser	245	250	255	
Thr	Pro	Ser	Ile	Pro	Ala	Asp	Ser	Ser	Ala	His	Ser	Thr	Pro	Ser	Ala	260	265	270	
Pro	Ala	Asp	Asn	Gly	Ala	Asn	Gly	Thr	Val	Leu	Ile	Leu	Ser	Thr	His	275	280	285	
Asp	Ala	Tyr	Arg	Pro	Val	Asp	Pro	Ser	Ala	Tyr	Lys	Arg	Ala	Leu	Pro	290	295	300	
Gln	Glu	Glu	Gln	Glu	Asp	Val	Gly	Pro	Arg	His	Val	Asp	Pro	Asp	His	305	310	315	320
Phe	Arg	Ser	Thr	Ser	Thr	Thr	His	Asp	Ala	Tyr	Arg	Pro	Val	Asp	Pro	325	330	335	
Ser	Ala	Tyr	Lys	Arg	Ala	Leu	Pro	Gln	Glu	Glu	Gln	Glu	Asp	Val	Gly	340	345	350	
Pro	Arg	His	Val	Asp	Pro	Asp	His	Phe	Arg	Ser	Thr	Thr	His	Asp	Ala	355	360	365	
Tyr	Arg	Pro	Val	Asp	Pro	Ser	Ala	Tyr	Lys	Arg	Ala	Leu	Pro	Gln	Glu	370	375	380	

Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg  
 385 390 395 400

Ser Thr Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala  
 405 410 415

Tyr Lys Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg  
 420 425 430

His Val Asp Pro Asp His Phe Arg Ser Thr Ser Thr Thr His Asp Ala  
 435 440 445

Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys Arg Ala Leu Pro Gln Glu  
 450 455 460

Glu Gln Glu Asp Val Gly Pro Arg His Val Asp Pro Asp His Phe Arg  
 465 470 475 480

Ser Thr Thr His Asp Ala Tyr Arg Pro Val Asp Pro Ser Ala Tyr Lys  
 485 490 495

Arg Ala Leu Pro Gln Glu Glu Gln Glu Asp Val Gly Pro Arg His Val  
 500 505 510

Asp Pro Asp His Phe Arg Ser  
 515

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 <212> DNA  
 <213> T CRUZI

<220>  
 <221> CDS  
 <222> (1)..(1521)

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 Met Ala Arg Ala Val Val Leu Glu Asp Gly Ala Leu Tyr Val Ala Asp  
 1 5 10 15  
 aat gcc aac aac ctc gtt cga gaa atc tcc aat ggc gtt gtc act tcg 96  
 Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
 20 25 30  
 ttt att acg gaa gga ctg ctg ggc cca tcg tac atc aaa ccg tac agc 144  
 Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
 35 40 45  
 cgt aca aat ggc gct cat gac ttg ttt gtg tcg gac acg ggc aaa tca 192

Arg	Thr	Asn	Gly	Ala	His	Asp	Leu	Phe	Val	Ser	Asp	Thr	Gly	Lys	Ser	
50						55					60					
cgc	atc	att	ttt	gcc	cca	cct	cag	aaa	aaa	acg	ttc	atc	aca	gtg	ttt	240
Arg	Ile	Ile	Phe	Ala	Pro	Pro	Gln	Lys	Lys	Thr	Phe	Ile	Thr	Val	Phe	
65					70					75					80	
ata	aca	gga	ttc	cag	ccg	gat	gtt	ctt	caa	att	agc	gag	aag	agt	cgt	288
Ile	Thr	Gly	Phe	Gln	Pro	Asp	Val	Leu	Gln	Ile	Ser	Glu	Lys	Ser	Arg	
				85					90					95		
ttg	atg	ttt	gcc	atc	tgc	aat	tcc	acg	aaa	att	ctt	gcg	att	aat	atg	336
Leu	Met	Phe	Ala	Ile	Cys	Asn	Ser	Thr	Lys	Ile	Leu	Ala	Ile	Asn	Met	
			100					105					110			
cag	gga	gcc	aca	acc	ccg	aag	gag	tac	tgg	caa	gtt	gga	aat	gcg	gac	384
Gln	Gly	Ala	Thr	Thr	Pro	Lys	Glu	Tyr	Trp	Gln	Val	Gly	Asn	Ala	Asp	
		115					120					125				
tgc	atg	ggc	tat	cag	agt	tcc	ctc	atg	ctc	acg	acc	gag	gag	gat	aaa	432
Cys	Met	Gly	Tyr	Gln	Ser	Ser	Leu	Met	Leu	Thr	Thr	Glu	Glu	Asp	Lys	
	130					135					140					
ctc	ctc	tac	tac	ggc	ata	tta	aat	gga	acc	cca	tcc	atc	atg	tct	tta	480
Leu	Leu	Tyr	Tyr	Gly	Ile	Leu	Asn	Gly	Thr	Pro	Ser	Ile	Met	Ser	Leu	
145					150					155					160	
ccc	gcc	acc	aaa	acg	aag	acg	gaa	gca	ccc	aga	att	tgc	ccg	gat	gtg	528
Pro	Ala	Thr	Lys	Thr	Lys	Thr	Glu	Ala	Pro	Arg	Ile	Cys	Pro	Asp	Val	
				165					170					175		
ttg	ttg	cag	tgg	cca	cat	ggg	ccc	att	gtt	tcg	ctt	gtg	aat	att	aac	576
Leu	Leu	Gln	Trp	Pro	His	Gly	Pro	Ile	Val	Ser	Leu	Val	Asn	Ile	Asn	
		180						185					190			
aaa	cat	gca	ttt	tac	gtt	gtt	acc	gcc	tcc	aat	gta	tac	att	gta	cat	624
Lys	His	Ala	Phe	Tyr	Val	Val	Thr	Ala	Ser	Asn	Val	Tyr	Ile	Val	His	
		195					200					205				
gat	ggc	tcg	tat	cat	ccg	act	gga	tcc	atg	gcc	cag	ctc	caa	cag	gca	672
Asp	Gly	Ser	Tyr	His	Pro	Thr	Gly	Ser	Met	Ala	Gln	Leu	Gln	Gln	Ala	
	210					215					220					
gaa	aat	aat	atc	act	aat	tcc	aaa	aaa	gaa	atg	aca	aag	cta	cga	gaa	720
Glu	Asn	Asn	Ile	Thr	Asn	Ser	Lys	Lys	Glu	Met	Thr	Lys	Leu	Arg	Glu	
225					230					235					240	
aaa	gtg	aaa	aag	gcc	gag	aaa	gaa	aaa	ttg	gac	gcc	att	aac	cgg	gca	768
Lys	Val	Lys	Lys	Ala	Glu	Lys	Glu	Lys	Leu	Asp	Ala	Ile	Asn	Arg	Ala	
				245				250						255		
acc	aag	ctg	gaa	gag	gaa	cga	aac	caa	gcg	tac	aaa	gca	gca	cac	aag	816
Thr	Lys	Leu	Glu	Glu	Glu	Arg	Asn	Gln	Ala	Tyr	Lys	Ala	Ala	His	Lys	
			260					265					270			
gca	gag	gag	gaa	aag	gct	aaa	aca	ttt	caa	cgc	ctt	ata	aca	ttt	gag	864
Ala	Glu	Glu	Glu	Lys	Ala	Lys	Thr	Phe	Gln	Arg	Leu	Ile	Thr	Phe	Glu	
		275					280					285				
tcg	gaa	aat	att	aac	tta	aag	aaa	agg	cca	aat	gac	gca	gtt	tca	aat	912

Ser	Glu	Asn	Ile	Asn	Leu	Lys	Lys	Arg	Pro	Asn	Asp	Ala	Val	Ser	Asn	
290						295					300					
cgg	gat	aag	aaa	aaa	aat	tct	gaa	acc	gca	aaa	act	gac	gaa	gta	gag	960
Arg	Asp	Lys	Lys	Lys	Asn	Ser	Glu	Thr	Ala	Lys	Thr	Asp	Glu	Val	Glu	
305					310					315					320	
aaa	cag	agg	gcg	gct	gag	gct	gcc	aag	gcc	gtg	gag	acg	gag	aag	cag	1008
Lys	Gln	Arg	Ala	Ala	Glu	Ala	Ala	Lys	Ala	Val	Glu	Thr	Glu	Lys	Gln	
				325					330					335		
agg	gca	gct	gag	gcc	acg	aag	gtt	gcc	gaa	gcg	gag	aag	cgg	aag	gca	1056
Arg	Ala	Ala	Glu	Ala	Thr	Lys	Val	Ala	Glu	Ala	Glu	Lys	Arg	Lys	Ala	
			340					345					350			
gct	gag	gcc	gcc	aag	gcc	gtg	gag	acg	gag	aag	cag	agg	gca	gct	gaa	1104
Ala	Glu	Ala	Ala	Lys	Ala	Val	Glu	Thr	Glu	Lys	Gln	Arg	Ala	Ala	Glu	
		355					360					365				
gcc	acg	aag	gtt	gcc	gaa	gcg	gag	aag	cag	aag	gca	gct	gag	gcc	gcc	1152
Ala	Thr	Lys	Val	Ala	Glu	Ala	Glu	Lys	Gln	Lys	Ala	Ala	Glu	Ala	Ala	
	370					375					380					
aag	gcc	gtg	gag	acg	gag	aag	cag	agg	gca	gct	gaa	gcc	acg	aag	gtt	1200
Lys	Ala	Val	Glu	Thr	Glu	Lys	Gln	Arg	Ala	Ala	Glu	Ala	Thr	Lys	Val	
385					390					395					400	
gcc	gaa	gcg	gag	aag	cag	agg	gca	gct	gaa	gcc	atg	aag	gtt	gcc	gaa	1248
Ala	Glu	Ala	Glu	Lys	Gln	Arg	Ala	Ala	Glu	Ala	Met	Lys	Val	Ala	Glu	
				405					410					415		
gcg	gag	aag	cag	aag	gca	gct	gag	gcc	gcc	aag	gcc	gtg	gag	acg	gag	1296
Ala	Glu	Lys	Gln	Lys	Ala	Ala	Glu	Ala	Ala	Lys	Ala	Val	Glu	Thr	Glu	
			420					425					430			
aag	cag	agg	gca	gct	gaa	gcc	acg	aag	gtt	gcc	gaa	gcg	gag	aag	cag	1344
Lys	Gln	Arg	Ala	Ala	Glu	Ala	Thr	Lys	Val	Ala	Glu	Ala	Glu	Lys	Gln	
		435					440					445				
aag	gca	gct	gag	gcc	gcc	aag	gcc	gtg	gag	acg	gag	aag	cag	agg	gca	1392
Lys	Ala	Ala	Glu	Ala	Ala	Lys	Ala	Val	Glu	Thr	Glu	Lys	Gln	Arg	Ala	
	450					455					460					
gct	gaa	gcc	acg	aag	gtt	gcc	gaa	gcg	gag	aag	cag	aag	gca	gct	gag	1440
Ala	Glu	Ala	Thr	Lys	Val	Ala	Glu	Ala	Glu	Lys	Gln	Lys	Ala	Ala	Glu	
465					470				475						480	
gcc	gcc	aag	gcc	gtg	gag	acg	gag	aag	cag	agg	gca	gct	gaa	gcc	acg	1488
Ala	Ala	Lys	Ala	Val	Glu	Thr	Glu	Lys	Gln	Arg	Ala	Ala	Glu	Ala	Thr	
				485					490					495		
aag	gtt	gcc	gaa	gcg	gag	aag	gat	atc	gat	ccc						1521
Lys	Val	Ala	Glu	Ala	Glu	Lys	Asp	Ile	Asp	Pro						
			500					505								

<210> 50  
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 <213> T CRUZI

<400> 50

Met Ala Arg Ala Val Val Leu Glu Asp Gly Ala Leu Tyr Val Ala Asp  
1 5 10 15

Asn Ala Asn Asn Leu Val Arg Glu Ile Ser Asn Gly Val Val Thr Ser  
20 25 30

Phe Ile Thr Glu Gly Leu Leu Gly Pro Ser Tyr Ile Lys Pro Tyr Ser  
35 40 45

Arg Thr Asn Gly Ala His Asp Leu Phe Val Ser Asp Thr Gly Lys Ser  
50 55 60

Arg Ile Ile Phe Ala Pro Pro Gln Lys Lys Thr Phe Ile Thr Val Phe  
65 70 75 80

Ile Thr Gly Phe Gln Pro Asp Val Leu Gln Ile Ser Glu Lys Ser Arg  
85 90 95

Leu Met Phe Ala Ile Cys Asn Ser Thr Lys Ile Leu Ala Ile Asn Met  
100 105 110

Gln Gly Ala Thr Thr Pro Lys Glu Tyr Trp Gln Val Gly Asn Ala Asp  
115 120 125

Cys Met Gly Tyr Gln Ser Ser Leu Met Leu Thr Thr Glu Glu Asp Lys  
130 135 140

Leu Leu Tyr Tyr Gly Ile Leu Asn Gly Thr Pro Ser Ile Met Ser Leu  
145 150 155 160

Pro Ala Thr Lys Thr Lys Thr Glu Ala Pro Arg Ile Cys Pro Asp Val  
165 170 175

Leu Leu Gln Trp Pro His Gly Pro Ile Val Ser Leu Val Asn Ile Asn  
180 185 190

Lys His Ala Phe Tyr Val Val Thr Ala Ser Asn Val Tyr Ile Val His  
195 200 205

Asp Gly Ser Tyr His Pro Thr Gly Ser Met Ala Gln Leu Gln Gln Ala  
210 215 220

Glu Asn Asn Ile Thr Asn Ser Lys Lys Glu Met Thr Lys Leu Arg Glu  
225 230 235 240



Lys Val Lys Lys Ala Glu Lys Glu Lys Leu Asp Ala Ile Asn Arg Ala  
 245 250 255

Thr Lys Leu Glu Glu Glu Arg Asn Gln Ala Tyr Lys Ala Ala His Lys  
 260 265 270

Ala Glu Glu Glu Lys Ala Lys Thr Phe Gln Arg Leu Ile Thr Phe Glu  
 275 280 285

Ser Glu Asn Ile Asn Leu Lys Lys Arg Pro Asn Asp Ala Val Ser Asn  
 290 295 300

Arg Asp Lys Lys Lys Asn Ser Glu Thr Ala Lys Thr Asp Glu Val Glu  
 305 310 315 320

Lys Gln Arg Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln  
 325 330 335

Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Arg Lys Ala  
 340 345 350

Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu  
 355 360 365

Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala  
 370 375 380

Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr Lys Val  
 385 390 395 400

Ala Glu Ala Glu Lys Gln Arg Ala Ala Glu Ala Met Lys Val Ala Glu  
 405 410 415

Ala Glu Lys Gln Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu  
 420 425 430

Lys Gln Arg Ala Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln  
 435 440 445

Lys Ala Ala Glu Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala  
 450 455 460

Ala Glu Ala Thr Lys Val Ala Glu Ala Glu Lys Gln Lys Ala Ala Glu  
 465 470 475 480

Ala Ala Lys Ala Val Glu Thr Glu Lys Gln Arg Ala Ala Glu Ala Thr  
485 490 495

Lys Val Ala Glu Ala Glu Lys Asp Ile Asp Pro  
500 505